Section II (Remarks)

A. Summary of Amendment to the Claims

By the present Amendment, claims 35-37 have been amended to correct typographical errors therein. Such amendments relate solely to correction of obvious errors, and are unrelated to reasons of patentability. A "filament comprising nickel or nickel filament" as originally recited in these claims represents a redundant expression. The second recitation of "filament" has been replaced with "alloy," as consistent in character with original claims 10, 25, 33, and 34 (all of which refer to "nickel or nickel alloy"). Claims 43-45 were previously cancelled.

The amendments made herein are fully consistent with and supported by the originally-filed disclosure of this application. No new matter within the meaning of 35 U.S.C. §132(a) has been introduced by the foregoing amendments.

B. Acknowledgement of Claims Previously Indicated to be Allowable

The September 19, 2008 Office Action at page 7 thereof reaffirms that claims 1-32, 35-36, 38, and 46-47 are allowable over the prior art of record.

C. Response to Claim Objection(s)

In the September 19, 2008 Office Action at page 1 thereof, claim 40 was indicated to be "objected to." At page 5-6 of the September 19, 2008 Office Action, claim 39 was rejected under 35 U.S.C. 103. Yet at page 7 of the September 19, 2008 Office Action, claim "39" was "objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims."

Given that the rejection of claim 39 at pages 5-6 of the September 19, 2008 tracked the language of claim 39, Applicants assume that the examiner intended to reject claim 39, and merely to object to claim 40. If Applicants are incorrect in this assumption, then additional time is hereby

requested to respond to the September 19, 2008 Office Action, given the examiner's contradictory indication therein as to the status of claims 39 and 40.

No amendments are made herewith to claims 39 or 40. The rejection of claim 39 is traversed for reasons provided *infra*, and claim 40 (which depends from claim 39) is allowable over the cited art for the same reasons as set forth in connection with claim 39.

D. Response to Claim Rejections Under 35 U.S.C. 102(e)

The September 19, 2008 Office Action contained a rejection of claim 43 under 35 U.S.C. 102(e). Such claim rejection was apparently issued in error, in that claim 43 was previously cancelled. Given the prior cancellation of claim 43, the rejection of such claim is moot, and no further response is necessary to the apparently erroneous rejection of claim 43 stated in the Office Action.

E. Response to Claim Rejections Under 35 U.S.C. 103

The September 19, 2008 Office Action contained multiple claim rejections under 35 U.S.C. 103, namely:

- a rejection of claims 33-34 under 35 U.S.C. 103 as being unpatentable for obviousness over U.S. Patent No. 5,834,627 to Ricco et al. ("Ricco") in view of U.S. Patent No. 4,680,093 to Morin ("Morin");
- a rejection of claim 37 under 35 U.S.C. 103 as being unpatentable for obviousness over Ricco in view of U.S. Patent No. 3,550,247 to Evans et al. ("Evans") (note that such reference was characterized by the examiner as "Stanley", but it appears that the Stanley represents the first inventor's *middle* name, rather than the first inventor's family name);
- a rejection of claim 39 under 35 U.S.C. 103 as being unpatentable for obviousness over Ricco in view of U.S. Patent No. 4,728,494 to Berchtold et al. ("Berchtold"); and
- a rejection of claims 41-42 under 35 U.S.C. 103 as being unpatentable for obviousness over Ricco in view of U.S. Patent No. 4,367,127 to Messing et al. ("Messing").

Such rejections are traversed for the reasons stated below.

1. Law Regarding Obviousness Rejections

To support a rejection under 35 U.S.C. 103, **the prior art reference(s) must teach all of the limitations of the claims**. MPEP § 2143.03.

In considering a reference for its effect on patentability, the reference is required to be considered in its entirety, including portions that **teach away** from the invention under consideration. Simply stated, the prior art must be considered as a whole. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (emphasis added); MPEP § 2141.02. "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." *Application of Wesslau*, 353 F.2d 238, 241 (C.C.P.A. 1965); *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve*, 796 F.2d 443, 448 (Fed. Cir. 1986), cert. denied, 484 U.S. 823 (1987). The Federal Circuit and its predecessor court have repeatedly held that **if references taken in combination would produce a 'seemingly inoperative' device, then such references teach away from the combination** and cannot serve as predicates for a *prima facie* case of obviousness. *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 60 USPQ2d 1001, 1010 (Fed. Cir. 2001); *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999) (proposed combination of references that would be inoperable for intended purpose supports teaching away from combination); *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (inoperable modification teaches away); *In re Sponnoble*, 405 F.2d 578, 587, 160 USPQ 237, 244 (C.C.P.A. 1969) (references teach away from combination if combination produces seemingly inoperative device).

According to the U.S. Supreme Court decision in *KSR International Co. v. Teleflex Inc.*, 127 S.Ct 1727, 167 L.Ed.2d 705, 82 USPQ2d 1385 (April 30, 2007), the court did not disavow the previous "teaching, motivation or suggestion" or "TSM" test, but stated that such TSM text *should not be strictly applied* in determining obviousness. In connection with this point, the Supreme Court stated that:

> "**A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.** ... [Rather], it can be **important to identify a reason that would have prompted a person of ordinary skill in the relevant art to combine the [prior art] elements in the manner claimed**." *KSR*, 82 USPQ2d at 1389.

It is fundamental to a proper rejection of claims under 35 U.S.C. § 103 that an examiner must present a convincing line of reasoning supporting the rejection. MPEP 2144 ("Sources of Rationale Supporting a Rejection Under 35 U.S.C. 103"), citing *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985). The Supreme Court in *KSR* affirmed the validity of such approach, stating that "**there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness**." *KSR*, 82 USPQ2d at 1396.

In *KSR*, the Supreme Court further confirmed that **references that teach away from the invention are evidence of the non-obviousness** of a claimed invention, (*KSR*, 82 USPQ2d at 1395, 1399) and reaffirmed the principle that a factfinder judging patentability "should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning."

Following *KSR*, the Federal Circuit held that although "rigid" application of the "teaching, suggestion, or motivation" ("TSM") test for obviousness is improper, **application of a flexible TSM test remains the primary guarantee against improper "hindsight" analysis**, because a flexibly applied TSM test ensures that the obviousness analysis proceeds on the basis of evidence in existence before time the application was filed, as required by 35 U.S.C. §103. *Ortho-McNeil Pharm. Inc. v. Mylan Labs., Inc.*, 520 F3d 1358, 86 USPQ2d 1196, 1201-02 (Fed. Cir. 2008)

An obviousness rejection must be premised on art reasonably available to the applicant. "In order to rely on a reference as a basis for rejection of an applicant's invention, the **reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem** with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992); *see also In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); MPEP 2141.01(a). The Court of Customs and Patent Appeals has explained the policy that reference be available to the inventor as follows:

> In resolving the question of obviousness under 35 USC 103, we presume full knowledge by the inventor of all the prior art in the field of his endeavor. However, with regard to prior art outside the field of his endeavor, we only presume knowledge from those arts reasonably pertinent to the particular problem with which the inventor was involved. ... The rationale behind this rule precluding rejections based on combination of teachings of references from nonanalogous arts is the realization that an inventor could not possibly be aware of every teaching in every art. Thus, we attempt to more closely approximate the reality of the circumstances surrounding the making of an invention by only presuming knowledge by the inventor of prior art in the field of his endeavor and in analogous arts.

In re Wood and Eversole, 599 F.2d 1032, 202 USPQ 171, 174 (C.C.P.A. 1979) (*citing In re Antle*, 444 F.2d 1168, 1171-72, 170 USPQ 285, 287-88 (C.C.P.A. 1971)).

In a more recent case addressing non-analogous art, the Federal Circuit held that art directed to static or read-only memory circuits with replaceable modules of varying sizes for industrial controllers was **not in the same field of endeavor** as compact modular dynamic memory chips for personal computers. *Wang Labs., Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993) (upholding validity of patent directed to compact modular memory circuits as non-analogous to, and directed to different problem than, art relating to industrial controller memories having modules of varying sizes).

A suggestion to combine references **cannot require substantial reconstruction or redesign** of such references, **or a change in basic operating principles** of a construction of a reference, to arrive at the claimed invention. *In re Ratti*, 270 F.2d 810, 123 USPQ 349, 352 (C.C.P.A. 1959).

2. Disclosure of Ricco in Application to Rejected Claims 33, 34, 37, 39, 41, and 42

Ricco discloses a calorimetric gas sensor that uses a resistively heated, noble metal-coated micromachined polycrystalline silicon filament.

With respect to claims 33 and 34 of the present application, the examiner concedes (i.e., at page 4 of the September 19, 2008 Office Action) that "Ricco et al. does not particularly disclose or suggest a core comprising silicon carbide."

With respect to claim 37 of the present application, the examiner concedes (i.e., at page 4 of the September 19, 2008 Office Action) that "Ricco does not particularly disclose or suggest electrochemical thinning said gas-sensing filament for a sufficient period of time, so as to reduce the average diameter thereof."

With respect to claim 39 of the present application, the examiner concedes (i.e., at page 6 of the September 19, 2008 Office Action) that "Ricco does not particularly disclose a nickel-copper-aluminum alloy."

With respect to claims 41-42 of the present application, the examiner concedes (i.e., at page 6 of the September 19, 2008 Office Action) that Ricco "does not disclose a nickel-containing gas filament having a porous surface."

3. Disclosure of Morin in Application to Rejected Claims 33 and 34

Morin discloses "metal coated filament-metal bonded composites made up of a plurality of filaments electroplated with a firmly bonded metallic layer and thereafter bonded together ... by means of a metal matrix." (Morin, col. 1, lines 8-13.) In the background of the invention, Morin states that filaments of semimetals are useful in reinforcing metals and plastics but that problems have been experienced in translating properties (e.g., breaking strength) of the high strength filaments to the matrix metal. Morin purports to overcome these difficulties by first coating electrically conductive core filaments with metal by electrochemical deposition (i.e., to impart core-to-metal bond strength sufficient to eliminate peeling of the metal coating even when the coated filament is bent sharply), and then building up a metal matrix around a large number of these metal coated fibers (e.g., arranged side by side in parallel relationship) to form a composite material of improved strength.

Coated filaments according to Morin are used exclusively for **structural reinforcement** of parts including metal matrices binding a large number of coated filaments – such as "in aircraft, aerospace, automobiles, office equipment, sporting goods, etc." (Morin, col. 1, lines 27-28.) Nothing in Morin teaches or remotely suggests the use of a metal coated filament as a gas sensor. Morin is not related to gas sensing or any gas sensing device.

4. Disclosure of Evans ('Stanley') in Application to Rejected Claim 37

Evans discloses a method for producing a metal composite. Carbon filaments are coated with a metal by electrodeposition, electroless plating, or chemical plating. Before being coated with metal, the carbon filaments are subjected to an oxidizing treatment, to improve adhesion between the filament and the subsequently deposited metal coating. Evans discloses the use of electroless plating by chemical reduction, in which carbon filaments are dipped into in a solution (e.g., palladium chloride), containing palladium ions, and followed by ***chemically* "reducing** those ions to the metal." (Evans, col. 3, line 69 – col. 4, line 6.) "The reduction may be carried out, for example, by immersing the dipped carbon filaments in the electroless nickel plating solution which contains a [chemical] reducing agent, for example sodium hypophosphite." Such reaction is used to ADD metal to a filament, consistent with Evans' disclosure that composites may be used as a basis for ***building up*** metal matrices around them to a desired shape. See, e.g., Evans, col. 2, lines 38-48, as reproduced below:

> "After an initial metal coating has been formed on the carbon filaments, either by electrodeposition, electroless plating or by chemical plating, the metal matrix may be built up to the desired shape around the coated fibres for example by electroforming, or by powder technology techniques, or by casting, which includes the vacuum process known as the liquid infiltration of molten metal. **When the initial metal coating is formed by electrodeposition then this may be continued until the metal matrix is formed**; the whole metal coating process could then be said to be an electroforming process."

Nothing in Evans discloses or remotely suggests any gas sensing filament, or teaches electrochemical thinning of a filament to reduce the average diameter thereof. To the contrary, Evans teaches that filament diameter should be *increased* (built up) by various steps including electrodeposition.

5. Disclosure of Berchtold in Application to Rejected Claim 39

Berchtold discloses spectacle frames made of an alloy including copper, aluminum, and nickel, optionally including fractions of beryllium and carbon. The object of Berchtold's invention was:

> "... to develop nickel alloys for spectacle frames and other spectacle parts, e.g., hinges and screws, which besides good resistance to corrosion and good workability also present the possibility of being produced in a simple manner." (Berchtold, Col. 1, lines 59-63.)

Nothing in Berchtold discloses or remotely suggests any gas-sensing filament comprising a nickel-copper-aluminum alloy. Berchtold is not related to gas sensing or any gas sensing device.

6. Disclosure of Messing in Application to Rejected Claims 41-42

Messing discloses a metal recovery cell and electrode assembly, useful for efficiently recovering low concentrations of metal ions from liquid electrolytes in a residual metal plating bath. The recovery cell includes an electrode comprising (1) a tubular sparger having a central cavity for receiving flow of electrolyte, whereby electrolyte flows radially through permeable cylindrical wall: (2) a first electrolyte-permeable (and high surface area) electrode that coaxially surrounds the sparger to receive the radial flow therefrom; (3) an electrically insulating electrolyte-permeable spacer surrounding the first electrode; and (4) a second electrolyte-permeable electrode contacting the insulating spacer at the side opposed to the first electrode, for receiving and passing the continuing radial flow. (Messing, col. 2, lines 25-42.) The first electrode (e.g., cathode) preferably comprises an electrically continuous 'tow' that is composed of multiple oxidized carbon (e.g., graphitic) filaments coated "coated with a thin layer of electroplated or otherwise deposited nickel, which adds greatly desired properties to the very porous and high surface area electrode." (Messing, col. 2, lines 54-57 & col. 3, lines 30-34.) "[I]n typical tows of the order of **3,000 to 40,000 such filaments will often be present in side-by-side extending fashion in the bundle of filaments, which define the tow [electrode].**" (Messing, col. 3, lines 12-14.) "[T]he resulting ['tow'] structure is highly porous to the radial flow of electrolyte proceeding outwardly from the sparger and also present[s] a very high surface area." (Messing, col. 3, lines 40-42.)

Messing's inner electrode 'tow' is thus formed with literally thousands of metal-coated filaments arranged in parallel fashion to form a bundle. The filament bundle forms the electrode wall, through which electrolyte flows radially. Electrolyte flows between individual filaments of the electrode 'tow' – such that the electrode tow is porous. Such porosity refers to spacing between

filaments in the bundle, NOT to the filaments themselves. Indeed, filaments coated with metal by electroplating or other deposition techniques would ordinarily be expected to provide a non-porous outer surface.

Nothing in Messing discloses an individual filament having a porous surface, or any gas sensor filament. Messing is not related to gas sensing or any gas sensing device.

7. Patentable Distinctions of Claims 33-34 Over Ricco and Morin

Claims 33 and 34 are reproduced below.

> 33. A gas sensor assembly comprising a gas-sensing filament comprising a coating structure and a core structure, wherein said coating structure comprises nickel or nickel alloy, and wherein said core structure comprises silicon carbide.
>
> 34. A gas sensor assembly comprising a gas-sensing filament comprising a coating structure and a core structure, wherein said coating structure comprises nickel or nickel alloy, and wherein said core structure comprises a carbon center and a sheath of silicon carbide.

The examiner concedes that Ricco does not teach or suggest use of silicon carbide in a gas sensing filament. In an attempt to remedy such deficiency in Ricco's disclosure, the examiner alleges that "[i]t would be obvious ... to utilize in Ricco et al. the core of Morin because it would provide a metal coated filaments wherein the core-to-metal bond strength being sufficient to provide that, **when the coated filament is bent sharply** the coating may fracture, but it will not peel off thereby, realizing a reliable and secure filament to make the above combination very effective." (September 19, 2008 Office Action page 4.)

The rejection of claims 33 and 34 premised on the hypothetical combination of Ricco and Morin is unsupportable because Morin constitutes non-analogous art. "In order to rely on a reference as a basis for rejection of an applicant's invention, the **reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem** with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992); *see also In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); MPEP 2141.01(a). Morin is directed the field of reinforcing structural parts containing large numbers of metal coated fibers bound in a metal matrix for end use applications such as

such as "in aircraft, aerospace, automobiles, office equipment, sporting goods, etc." (Morin, col. 1, lines 27-28.) Such fiber-reinforced structural parts are NOT in the field of gas sensing (i.e., Applicants' field of endeavor). Moreover, gas sensors are not subject to significant structural loads, and are typically not subject to being "bent sharply" as articulated by Morin as a basis for ensuring that a metal-coated fiber exhibits sufficiently high bond strength to resist peeling. Accordingly, Morin constitutes art that is non-analogous to the subject matter of claims 33 and 34, such that the combination of Morin with Ricco cannot properly support an obviousness rejection under 35 U.S.C. 103 (see *In re Oetiker, supra,* and MPEP 2141.01(a).)

Given the clear distinctions between Morin's technical field and central problem, on the one hand, and the technical field and central problem of Applicants' claims 33 and 34, the reasoning supporting the hypothetical combination of Ricco with Morin lacks "rational underpinning to support the legal conclusion of obviousness." (*KSR*, 82 USPQ2d at 1396.)

Applying a flexible "teaching, suggestion, motivation" (TSM) test for obviousness (i.e., as validated this year by the Federal Circuit in *Ortho-McNeil Pharm. Inc. v. Mylan Labs., Inc., supra*), the proposed combination of Morin with Ricco also fails to support the rejection under 35 U.S.C. 103. Nothing in Ricco suggests that Ricco's gas sensing filament is in any way deficient in core-to-metal bond strength or exhibits poor reliability, or that such filament is otherwise unsuitable for its intended purpose. Nothing in Ricco teaches or suggests modification of Ricco's disclosure to substitute a material such as silicon carbide core for the silicon material taught by Ricco. One skilled in the art would not be motivated by to consider Morin's disclosure because Morin is not concerned with gas sensing or the problems overcome by Applicant in developing the subject matter of claims 33 and 34. Accordingly, the cited art is devoid of any teaching, suggestion, or motivation that would provide proper basis for supporting a conclusion of obviousness applying a flexible TSM test.

For the foregoing reasons, withdrawal of the rejections of claims 33 and 34 under 35 U.S.C. 103 is warranted, and is respectfully requested.

8. Patentable Distinctions of Claim 37 Over Ricco and Evans ('Stanley')

Amended claim 37 is reproduced below:

> 37. A method for forming a gas sensor assembly, comprising the steps of:
> (a) providing a gas sensor assembly precursor comprising a gas-sensing filament comprising nickel or nickel alloy;
> (b) electrochemically thinning said gas-sensing filament for a sufficient period of time, so as to reduce the average diameter thereof.

In chemistry, a reduction-oxidation ("redox") reaction refers to a chemical reaction in which oxidation states of atoms are changed. The concept of chemical reduction is explained by Wikipedia.org, as reproduced in pertinent part below.

> "The term 'redox' comes from the two concepts of reduction and oxidation. It can be explained in simple terms:
> - **Oxidation** describes the loss of electrons / hydrogen or gain of oxygen / increase in oxidation state by a molecule, atom or ion
> - **Reduction** describes the gain of electrons / hydrogen or a loss of oxygen / decrease in oxidation state by a molecule, atom or ion their oxidation
>
> * * *
>
> Substances that have the ability to reduce other substances are said to be reductive and are known as reducing agents, reductants, or reducers. Put in another way, the reductant transfers electrons to another substance, and is, thus, oxidized itself. And, because it "donates" electrons it is also called an electron donor. Reductants in chemistry are very diverse. **Metal reduction** — electropositive elemental metals can be used (Li, Na, Mg, Fe, Zn, Al). **These metals donate or give away electrons readily**."

Source: http://en.wikipedia.org/wiki/Chemical_reduction .

Evans discloses the use of electroless plating by chemical reduction, in which carbon filaments are dipped into in a solution (e.g., palladium chloride), containing palladium ions, and followed by ***chemically*** **"reducing** those ions to the metal." (Evans, col. 3, line 69 – col. 4, line 6.) This **chemical** reduction performed by Evans constitutes a process for **adding** material (metal) to a filament, thereby **increasing** the diameter of such filament – precisely the ***opposite*** of the electrochemical thinning to **reduce** average diameter of a filament as required by Applicants' claim 37. That is, chemical reduction performed by Evans does not result in any reduction of filament diameter as required by claim 37.

In this regard, the disclosure of Evans teaches away from the subject matter of claim 37, and fails to remedy the deficiencies of Ricco in disclosing same. Such teaching away constitutes evidence of non-obviousness. (*KSR*, 82 USPQ2d at 1395, 1399.)
Furthermore, Evans fails to disclose or suggest any gas sensing filament.

As Evans fails to remedy the deficiencies of Ricco in disclosing all elements of claim 37, withdrawal of the rejection of claim 37 premised on Ricco and Evans is warranted, and is respectfully requested.

9. Patentable Distinctions of Claim 39 Over Ricco and Berchtold

Claim 39 is reproduced below:

> 39 A gas sensor assembly comprising a gas-sensing filament comprising a nickel-copper-aluminum alloy.

To remedy the admitted deficiencies of Ricco in disclosing a gas sensor according to claim 39, the examiner points to the disclosure of Berchtold, which is specifically directed to fabrication eyeglass frames. The reasoning supporting the examiner's combination in this regard is reproduced below.

> "It would have been obvious … to utilize in Ricco the nickel-copper-aluminum alloy of Berchtold because the nickel-copper-aluminum alloys have a very good resistance to corrosion and a very good processability. Nickel, chromium, aluminum, copper and lead are examples of metals which can **benefit from reinforcement with carbon filaments** in certain uses. Thus, the strength of components made of nickel or chromium or their alloys which are subject to high temperatures, for example turbine blades, may be **improved by the incorporation of carbon filaments** to make the above combination more effective."

(September 19, 2008 Office Action, page 6.)

The examiner's discussion of "carbon filaments" in the foregoing passage is curious, because claim 39 never once mentions the term "carbon." It appears that the examiner is simply mistaken in his reasoning supporting the proposed combination of Ricco and Berchtold.

The rejection of claim 39 premised on the hypothetical combination of Ricco and Berchtold is unsupportable because Berchtold constitutes non-analogous art. Again, "[i]n order to rely on a reference as a basis for rejection of an applicant's invention, the **reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem** with which the inventor was concerned," *In re Oetiker*, *supra*; MPEP 2141.01(a). Berchtold is directed the field of eyeglass frames, which have nothing at all to do with the field of gas sensing (i.e., Applicants' field of endeavor). Accordingly, Berchtold constitutes art that is non-analogous to the subject matter of claim 39, such that the combination of Berchtold with Ricco cannot properly support an obviousness rejection under 35 U.S.C. 103.

Applying a flexible "teaching, suggestion, motivation" (TSM) test for obviousness (i.e., as validated this year by the Federal Circuit in *Ortho-McNeil Pharm. Inc. v. Mylan Labs., Inc., supra*), the proposed combination of Morin with Ricco also fails to support the rejection under 35 U.S.C. 103. Nothing in Ricco suggests that Ricco's gas sensing filament is in any way unsuitable for its intended purpose. Nothing in Ricco teaches or suggests modification of Ricco's disclosure to substitute a nickel-copper-aluminum alloy for the specific filament materials taught by Ricco, or to look to the field of eyeglass frames (i.e., Berchtold) for material substitution ideas. One skilled in the art would not be motivated to consider Berchtold's disclosure because Berchtold is not concerned with gas sensing. Accordingly, the cited art is devoid of any teaching, suggestion, or motivation that would provide proper basis for supporting a conclusion of obviousness applying a flexible TSM test.

For the foregoing reasons, withdrawal of the rejection of claim 39 under 35 U.S.C. 103 premised on Ricco and Berchtold is warranted, and is respectfully requested.

10. Patentable Distinctions of Claims 41-42 Over Ricco and Messing

Claims 41 and 42 are reproduced below.

> 41. A gas sensor assembly comprising a nickel-containing gas-sensing filament, wherein the gas-sensing filament has a porous surface.
>
> 42. The gas sensor assembly of claim 41, wherein said porous surface is characterized by open pore structures.

In seeking to remedy the failure of Ricco to disclose a gas-sensing filament having a porous surface, the examiner has turned to a reference (Messing) in the field of electrolytic metal recovery from liquid baths. Reasoning supporting such combination is lacking, given the examiner's sole statement that:

> It would have been obvious ... to utilize in Ricco the techniques of Messing and realize the fialment (sic, filament) with nickel with the porous surface in an efficient manner."

(September 19, 2008 Office Action, pages 6-7.) Such "reasoning" merely states the result of the proposed combination without articulating any basis as to why the combination would be made.

The examiner has further misapprehended the disclosure of Messing in comparison to Applicants' claim 41. Such claim requires, *inter alia*, a "gas sensing filament [that] has a porous surface." Messing discloses a first electrode comprising a "tow" that is composed of thousands of filaments bundled in parallel and wrapped around a central sparger arranged to radially outlet electrolyte solution, with the tow or electrode enabling passage of such electrolyte solution between adjacent filaments of the filament bundle. That is, the **electrode or tow as a whole** (constituted of thousands of bundled parallel filaments) **is porous**, but **individual filaments of the electrode are not porous**. Because Messing fails to teach any individual filament having a porous surface, the proposed combination of Messing and Ricco fails to embody all features of Applicants' claim 41.

Even if Messing and Ricco in combination were to disclose the subject matter of Applicants' claim 41, however, the proposed combination would not be proper to support an obviousness rejection because Messing constitutes non-analogous art. Messing is directed to recovery of metal ions from a liquid solution, not gas sensing. Providing greater surface area to promote efficient recovery of ions from liquid solution is not a problem inherent to gas sensing. As Messing constitutes art that is non-analogous to the subject matter of claims 41 and 42, the proposed combination of Messing and Ricco cannot properly support an obviousness rejection under 35 U.S.C. 103 (see *In re Oetiker, supra,* and MPEP 2141.01(a).)

For the foregoing reasons, withdrawal of the rejection of claim 41 under 35 U.S.C. 103 premised on Ricco and Messing is warranted, and is respectfully requested. As claim 42 depends from and

therefore inherently includes all the features of claim 41 (35 U.S.C. 112), claim 42 is likewise distinguished over Ricco and Messing.

CONCLUSION

Based on the foregoing, all of Applicants' pending claims are patentably distinguished over the art, and in form and condition for allowance. The examiner is requested to favorably consider the foregoing, and to responsively issue a Notice of Allowance. If any issues require further resolution, the examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss same.

Respectfully submitted,

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